

MAGMA GmbH Press Release

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MAGMA presents MAGMASOFT® 6.1: Efficient and Sustainable Casting Processes

With MAGMASOFT® 6.1, the German company MAGMA presents the new release of its casting process simulation software. New functionalities and enhancements support the optimization of low pressure casting processes and simplify the design of die-cast parts. A new module covers rheocasting and thixomolding processes. A wide range of options for core production and continuous casting allow users to design process sequences both precisely and efficiently.

The new, fully integrated ECONOMICS Perspective enables users to quantitatively assess costs and CO₂ emissions based on already defined data, thus supporting sustainable and economical casting processes.

Low Pressure Die Casting:

Process Optimization With MAGMASOFT® 6.1

New solver technologies ensure both precision and efficiency when mapping complex casting processes. The new 'Heat-up Phase' complements the heating of the permanent mold with more flexible options for temperature control. Additional results and criteria support the analysis of both filling and solidification processes.

For counter-pressure casting, a dedicated extension is now available, taking into account both the optimization and the influence of process parameters, such as counter-pressure and pressure difference, on feeding and mechanical properties.

MAGMA ECONOMICS: Sustainable Production

MAGMA ECONOMICS is a new, fully integrated perspective of MAGMASOFT® that uses the capabilities of "Autonomous Engineering" for optimization and virtual design of experiments. ECONOMICS allows users to quantitatively evaluate costs and CO₂ emissions directly in the software and along the entire casting process – based on existing data. With customizable templates for common materials and processes, MAGMA ECONOMICS can compare scenarios without requiring additional simulation time, supporting informed decisions that simultaneously consider technical, economic and ecological goals.

MAGMAsemisolid: Innovation in Lightweight Design

The new process module MAGMAsemisolid uses a special viscosity model to take into account the specific conditions and thixotropic rheology of semi-liquid metallic melts in rheocasting and thixomolding processes. As a fully integrated, powerful tool, it helps to create process transparency and make optimum use of the potential of these manufacturing technologies.

MAGMAhpdc:

Optimized Component Design in High Pressure Die Casting

MAGMAhpdc facilitates the early design of castings, even before the machine or casting system has been determined. The new "Virtual Gate" function allows positioning multiple inlets directly on the casting, while flexible casting conditions enable a quick initial assessment of the die filling process.

Core Production and Continuous Casting:

Extended Simulation Capabilities

MAGMA C+M (core production) automatically calculates the pressure applied to the shooting nozzles based on the machine parameters, enabling a realistic mapping of the overall system of machine, core box and shooting

process. The calculated pressure curves integrate seamlessly into simulations and virtual design of experiments. The simulation time for gassing processes using inorganic binders has been significantly reduced. MAGMA C+M is now even more closely linked to the current machine configuration and provides robust, practical information for the real situation in the core-making shop.

The variable control of the pouring velocity in MAGMA CC (continuous casting) allows a flexible mapping of "stop & go" cycles. Mechanical influences of guide rollers on the strand deformation are also taken into account. The tracking of tracer particles makes it possible to analyze how melt is distributed across different strands via launders. The extended capabilities of MAGMA CC provide new quantitative information on process-dependent strand quality and support users in the efficient evaluation of results.

Additional Innovations for Increased Efficiency in All Casting Processes

MAGMASOFT® 6.1 provides advanced tools for the simulation, analysis and optimization of casting processes. The most important innovations include:

- Expanded material databases: New products have been added to the FOSECO Pro module, which now features Çukurova feeder datasets for the first time.
- New measurement mode for MAGMAstress: Distance, flatness and roundness are measured directly during the evaluation, facilitating the evaluation of casting distortions.
- 'Tracer count': Particles in the melt are counted in predefined areas.
- 'Channel Assistant': Cooling channels are automatically generated from existing voids in the mold geometry.

- Automatic export for MAGMAinteract®: Project results and STL geometries are automatically exported as MAGMAinteract® files, which reduces manual effort.

With these enhancements, MAGMA underlines its commitment to casting excellence: MAGMASOFT® 6.1 significantly expands the capabilities of casting process simulation and supports customers in optimizing their manufacturing processes in a targeted manner – with greater efficiency, precision and sustainability.

701 words, 5122 characters

Figures:

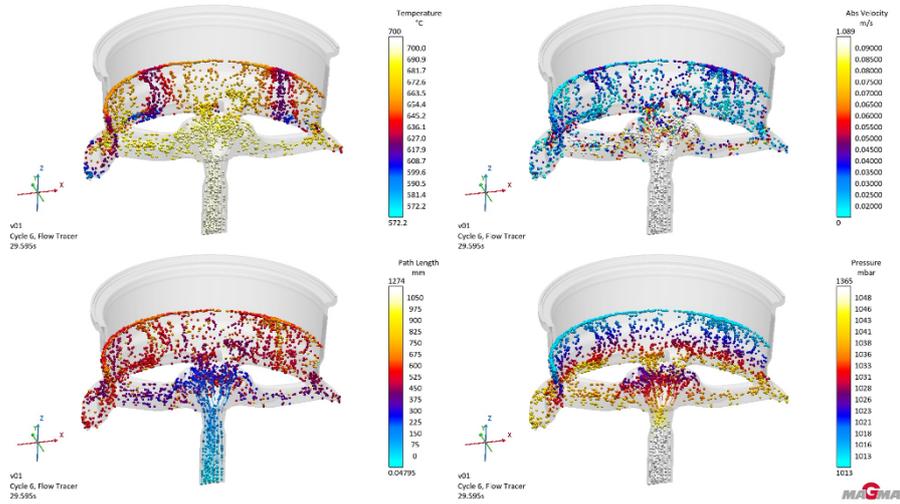


Figure 1: MAGMAIpdC users benefit from numerous innovations and improvements such as new, additional 'Tracer' results that make it possible to track melt movements and flows more precisely and to optimize design and process parameters in a more targeted manner.

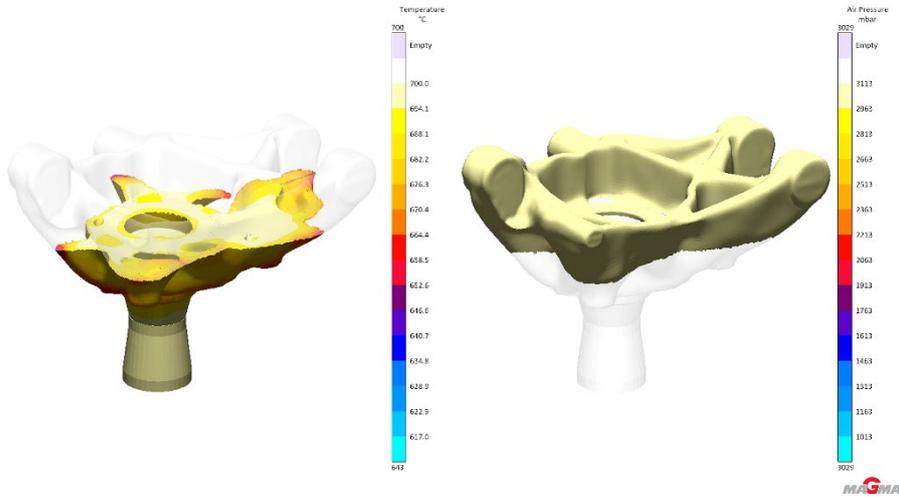


Figure 2: MAGMASOFT® 6.1 has been expanded to include the counter-pressure casting (CPC) process. This enables a specific definition and simulation of process parameters such as counter-pressure and pressure difference.

HPDC Cold Chamber Basic Cost Sheet for aluminum

Calculates the roughly estimated manufacturing costs
 -> Yellow marked lines are input fields!



Name	Basis		
Alloy costs	$f(x)$	23.48	€/part
Alloy costs per kg		2.5	€/kg
Number of cavities	$f(x)$	1	piece(s)
Number of Casting Materials		1	
Shot weight	$f(x)$	14.5512	kg
Casting	$f(x)$	9.3933	kg
Mass of Casting All IDs		9.3933	kg
Circular material	$f(x)$	5.1579	kg
Mass of Biscuit All IDs		1.7581	kg
Mass of Runner All IDs		2.2977	kg
Mass of Gate All IDs		0.0259	kg
Mass of Overflow All IDs		1.0761	kg
Melting costs	$f(x)$	14.55	€/part
Hourly rate for melting operation		1,000	€/hour
Melting performance per hour		1,000	kg/hour
Casting costs	$f(x)$	2.23	€/part
Hourly rate for casting machine operation		100	€/hour
Cycle time die casting machine per part	$f(x)$	80.36	s/part
Preparation (Definition)		42.5	s
Filling (Definition)		2.8589	s
Solidification & Cooling until Eject (Definition)		35	s
Manufacturing costs per part	$f(x)$	40.26	€/part

Figure 3: The new MAGMA ECONOMICS perspective supports users in quantitatively evaluating the economic and ecological impact of process variants. Customizable templates for common materials and processes contain specific cost and emission factors to precisely analyze resource consumption and production costs.

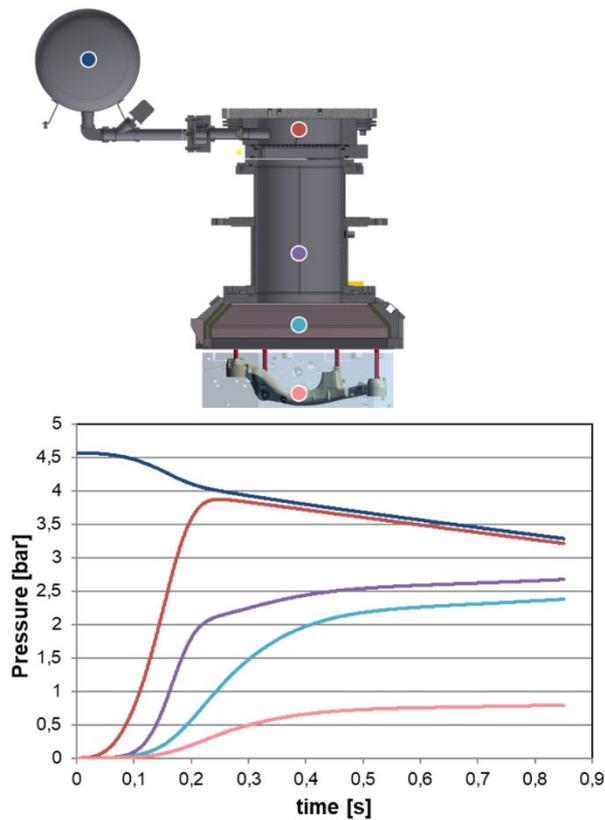


Figure 4: The new “Pressure Calculator” automatically calculates the pressure applied to the shooting nozzles based on the machine parameters. This improves the mapping of the overall system - consisting of machine, core box and process. The calculated pressure curves are used seamlessly in 3D simulations.

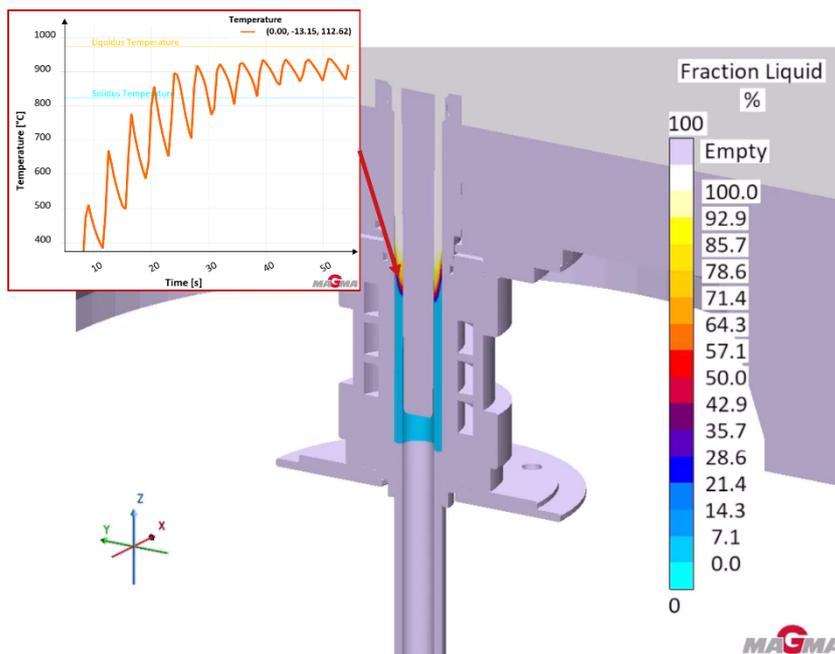
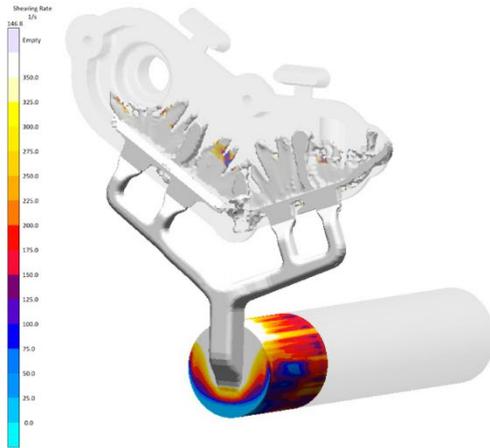


Figure 5: A variable design of the casting speed in MAGMA CC makes it possible to flexibly integrate and simulate pauses, return strokes and cyclical movements in the haul-off process. This “Stop & Go” cycle can be mapped across the entire continuous casting process.

Shearing Rate



Dynamic Viscosity

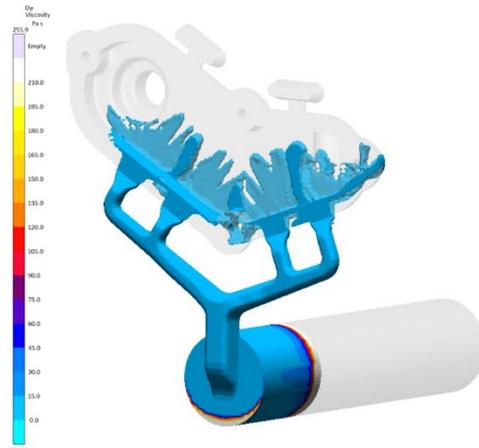


Figure 6: Now integrated into MAGMASOFT®: a rheological model for semi-solid metal slurries with temperature and shear-rate dependent viscosity (thixotropic flow behavior).

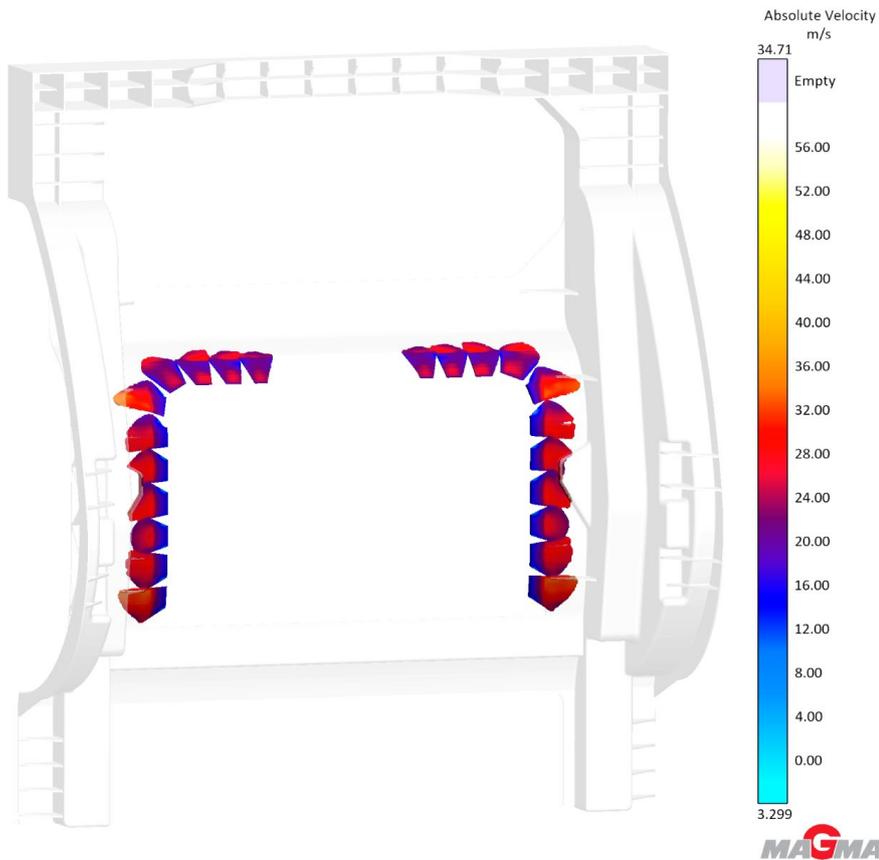


Figure 7: With the new 'Virtual Gate' function, die casters using MAGMAhpdc can position multiple inlets on the casting and reference the gating system directly to them.

Contact Information

Publication free, copies of appropriate citation requested. MAGMA Gießereitechnologie GmbH will not incur any additional costs as a result of the publication.

For comments, suggestions or more information about MAGMA and MAGMASOFT®, please contact:

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